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# Conservation and Reclamation INFORMATION LETTER

## Assessing Sites Reclaimed Using Natural Recovery Methods

### APPLICATION

This Information Letter applies to reclamation sites (e.g., wellsites, pipelines, plant sites, pits, mines) located on private and public land where the reclamation goal is to permit re-establishment of a native plant community on the disturbed area. Note that written permission from the landowner or land manager (on public land) is required.

### DEFINITIONS

**Natural Recovery Sites:** Natural recovery is a term used to describe disturbed sites (in native plant communities) left to revegetate naturally from the soil seedbank and propagules that come onto the site from adjacent undisturbed areas. Natural recovery may also be initiated by returning the LFH layer(s) and/or topsoil to a site. There is generally no seeding or simply light seeding of an annual crop to prevent erosion.

**Native Plant Communities:** These are plant communities that contain diverse native plant species adapted to the site conditions and are free of established populations of introduced plant species.

**Native Plants:** Native plant species are those that are indigenous to a particular region. They were in the landscape prior to Euro-American settlement, or have extended their range since then without human intervention. Native species are recognized for their intrinsic value as part of natural forest, grassland, montane and wetland ecosystems.

### THE GOAL

The long-term goal for natural recovery is the re-establishment of diverse native ecosystems (e.g., prairie, forest) that can

sustain appropriate multiple uses (e.g., grazing, wildlife habitat, timber production). The short-term goal is the establishment of compatible early successional species that provide erosion control and do not interfere with the existing or proposed end land use.

### BACKGROUND

The natural recovery option has gained popularity for some reclamation sites in recent years because of concerns about biodiversity, lack of timely return of forest resources and the lack of suitable native seed. Use of minimum disturbance construction techniques has become an important component of successful natural recovery plans.

Sustainable vegetation growth on reclaimed sites is very important for wind and water erosion control and post-reclamation land use (e.g., grazing, forestry, wildlife habitat).

In the past, disturbances within natural landscapes (e.g., native prairie, boreal forest) were most often re-vegetated with introduced non-native grasses and legumes to stabilize the site and to promote nutrient cycling.

An improved understanding of native landscape ecology and the results of reclamation approaches have caused rethinking of past practices:

- Recognition that planting a heavy grass/legume cover (to achieve 80% cover) often impedes the growth of tree seedlings on reclaimed sites. Planting annual crops rather than grass for initial erosion control may enhance natural ingress of native species or later reforestation.

- Observation that small sites in natural landscapes often revegetate from the soil seedbank and from natural encroachment quite readily when left to recover without seeding. Where there is no nearby source of non-native species, natural recovery sites often more closely resemble target communities than those seeded to grasses (native or non-native).

### THE PROBLEM

Existing revegetation criteria (e.g., wellsites or pipeline reclamation criteria) or approvals for industrial activity may require a minimum of 80% cover before the site is considered adequately reclaimed. This leads many proponents to continue to plant perennial grasses to achieve the 80% cover as quickly as possible. This may cause a conflict with longer term land use goals.

The Green Area Forested and Grassland wellsight reclamation criteria recommend minimum or low impact construction techniques and the use of native species, but there is no clear direction for industry or regulators who are considering and evaluating natural recovery sites. This IL provides guidance.

### WHEN IS NATURAL RECOVERY APPROPRIATE?

Natural recovery may be an appropriate revegetation option under the following conditions:

- The goal of the revegetation plan is the establishment of a native plant community;
- Risk of soil erosion is low or the site is protected by light seeding of an

- annual crop and/or with erosion control products;
- There are viable plant propagules in the topsoil at the time of replacement;
- There are adequate plant propagules available adjacent to the site (e.g., airborne tree seeds) and the shape and size of the site allows those propagules to easily disperse onto the site;
- The amount of non-native species (e.g., agronomic) in the surrounding vegetation is insignificant or they can be controlled;
- Restricted or noxious weeds (as defined by the *Weed Control Act* or the local municipality) are not a problem, or can be adequately dealt with under a weed management plan;
- Revegetation from the seedbank or other sources (e.g., tree seeds) is not hindered by other site factors (e.g., drought, soil chemistry, etc.); and,
- The site is not subject to heavy grazing or intensive recreational use.

## EVALUATING THE SUCCESS OF NATURAL RECOVERY SITES

The interpretation of successful revegetation is closely tied to the specific reclamation goal(s) for the site. The evaluator's knowledge of the area and the end land use is important. The current or planned land use for the reclaimed area must be sustainable and attainable.

Structure of the native plant community should indicate that plant succession is proceeding in the right direction. The presence of early successional species is acceptable, providing that they are compatible with adjacent plant species and land use.

If existing approved revegetation criteria are not applied, the following checklist must be used to ensure adequate revegetation for natural recovery sites. The answers in each case must be documented in the Detailed Site Assessment.

Appendix I provides guidance when applying the vegetation component of the

*Reclamation Criteria for Wellsites and Associated Facilities – 1995 Update.* The comments in the appendix also apply to the application of other approved criteria.

Timing of the evaluation will vary according to the type of disturbance, type of soil salvage procedures and precipitation. A wellsite or pipeline in a moist forest environment may be ready for final assessment by the second growing season following final reclamation. However, revegetation of a similar site in a drought-prone prairie environment may require a number of years before a final assessment is appropriate.

It is important that natural recovery sites be monitored for erosion prevention, compatibility and sustainable plant growth, similar to seeded sites.

### Erosion Prevention

The revegetated area must be able to prevent wind and water erosion, unless erosion is an integral part of the landscape (e.g., sand dunes, badlands). The minimum level of acceptable ground cover is site specific and varies according to offsite cover levels, safety requirements, soil type/textures, plant community, wind, precipitation and slope. Early site stabilization using non-native, non-persistent plants (e.g., annuals) is acceptable.

Revegetation on natural recovery sites is acceptable when:

- The stability of the landform/landscape is assured (i.e., there is no evidence of progressive erosion such as erosion rills, fans or gullies, raised pebbles, pedestalling of plants, increased topsoil depth along fence lines or ditches, as compared to appropriate controls);
- There is sufficient litter or other acceptable cover (e.g., woody debris) to ensure protection from future erosion.

### Compatibility

In natural recovery, revegetation success depends on the establishment of early successional native plant species that are compatible with the surrounding landscape. The integrity of native plant communities should be maintained.

Sites left to recover naturally often get a flush of non-persistent annual weeds

(such as *Descurainia sp.* flixweed) in the first few years. This is not usually a concern since they provide early erosion control. If the weeds are very dense and thought to be affecting native plant establishment, they can be mowed, where practical, prior to seed set.

Revegetation on natural recovery sites is successful when:

- The species growing on the site do not interfere with the existing or proposed end land use/s and that land use can be sustained (e.g., grazing, wildlife habitat, timber production);
- The reclaimed area can be utilized in the same manner and in conjunction with the adjacent lands (unless end land use is changed);
- Restricted or noxious weeds as designated in the *Weed Control Act* (or by the local municipality) are no more abundant than in controls;
- Invasive non-native plants (e.g., smooth brome, crested wheatgrass, timothy) are absent unless they are established in the adjacent control (see C&R/IL/01-6);
- Vegetation on the site is developing along expected successional trends (e.g., annual weeds are not significantly inhibiting native perennial establishment or growth).

### Sustainable Plant Growth

The reclaimed site must be able to sustain plant growth that is equivalent to pre-disturbance growth, to similar nearby controls or to a target agreed upon (in writing) with the landowner and regulator. Access management should be implemented to protect recovering vegetation where required.

Revegetation on natural recovery sites is successful if:

- There is healthy, vigorous above-ground growth with no more evidence of plant disease or stress than is found on suitable nearby controls;
- Plants have healthy root systems and can survive a "tug test". There should be no evidence of disease or limiting obstruction (e.g., horizontal layering that is compressing roots) than is found on suitable nearby controls;

- Perennial plants are mature (e.g., can survive grazing/browsing pressure through at least one growing season with no access controls);

## CONTROLS

Normally in natural ecosystems, direct comparisons with controls are not possible. Usually the vegetation type or land use in the adjacent undisturbed land differs significantly from that on the reclaimed area or is at a different successional stage.

In forested natural recovery areas, for example, some early succession under-story species can recover quite quickly (e.g., fireweed). Plant composition, however, won't look like adjacent undisturbed surroundings for a number of years (unless the surrounding area was recently burned or harvested).

It is sometimes possible to use appropriate adjacent areas or surrogate controls (similar sites at a distance) to draw inferences about expected performance on revegetated areas.

Surrogate controls should be as close to and as similar to the disturbed area as possible (e.g., same Natural Subregion, same end land use, soils, vegetation type, successional stage, slope and aspect).

The number of controls used is dependent on the variability and the size of the disturbed area.

## CONTACTS

The following can be reached toll free by calling 310-0000 and then dialing the number shown below.

### For public lands:

Alberta Sustainable Resource Development  
Public Lands Branch,  
3rd Floor, 9915 - 108 Street,  
EDMONTON, Alberta T5K 2G8.

Phone: (780) 427-3570

Fax: (780) 422-4251

e-mail: reclaim.account@env.gov.ab.ca

### For all other lands:

Alberta Environment,  
Science and Standards Branch,  
4th Floor, 9820-106 Street,  
EDMONTON, Alberta T5K 2J6

Phone: (780) 427-5883

Fax: (780) 422-4192

e-mail: land.management@gov.ab.ca



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## APPENDIX 1

### Note:

The following information is taken from the *Reclamation Criteria for Wellsites and Associated Facilities – 1995 Update*. Other reclamation assessment criteria are available (e.g., *Pipeline Reclamation Criteria*). The bolded comments below apply to all reclamation assessment criteria being used in Alberta.

Regulators have used an arbitrary target of 80% live vegetation cover for many years. This ensures that erosion is controlled in the majority of situations. For the Wellsite Criteria in general, the cover requirement can be waived for natural recovery sites providing that:

- Written permission is obtained from the appropriate Inspector or permission is granted via the public land disposition or Area Operating Agreement.
- The site meets other applicable vegetation criteria and the assessment criteria outlined in this Information Letter.

### A. Forested Land in the Green Area and Peat Land

Revegetation objectives for natural recovery sites on forested sites in the Green Area primarily include one or more of the following:

- Timber production
- Wildlife habitat
- Maintenance of biodiversity

On peat lands, the latter two objectives are most important. In some instances, other considerations for revegetation objectives may include aesthetics (e.g., recreation areas) and livestock grazing (e.g., grazing leases). The specific objective/s for the reclaimed area should be identified and documented. The landowner or land manager should be consulted. In areas under a Forest Management Agreement (FMA), consultation and collaboration with the FMA holder for reforestation is encouraged (particularly when a site is within or adjacent to a recently harvested cut-block).

### Landscape Criteria

Vegetation	Plants should be healthy and suitable for the site. Characteristics to look for are vigour, height, colour, disease and vegetation quality.  It is important to look at above and below ground (root) health for native species re-establishing on reclamation sites.
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### Vegetation Criteria

For the lease and access the operator will document species composition and cover. These assessments are based on a visual comparison between lease or access vegetation and the control (only where appropriate; use of a surrogate control, if available, is permissible).

Species Composition	<p>Revegetation species and species composition should be compatible with original or control vegetation or meet reasonable land management objectives.</p> <p><b>The main native vegetation species should be documented, as well as any non-native weeds or agronomic species. Notes should be made about the compatibility of the species present on the site with the existing or intended land use. In forested natural recovery areas, for example, some early succession understory species can recover quite quickly (e.g., fireweed). Plant composition, however, won't look like offsite for a number of years (unless the surrounding area was recently burned or harvested). In areas held under FMA, consultation and collaboration with the FMA holder for possible reforestation is important.</b></p>
Cover	<p>Where there is no control vegetation or the control vegetation is different, ≥80% cover of plants, litter and woody debris unless otherwise authorized by the CRI in writing.</p> <p><b>The evaluator's knowledge of the area and the end land use is important. ≥80% cover may not be necessary or desirable, and should be waived if the natural recovery assessment criteria in this IL are met. If the end land use is timber harvesting, then the amount of cover on the site should be sufficient to prevent erosion but not impede tree growth. Density may be a more appropriate assessment parameter than cover for vegetation communities such as forests.</b></p>

## B. Grassland and White Area Forested Sites

Revegetation objectives for natural recovery sites in both the Green and White Area (grasslands) and on White Area Forested sites usually include one or more of the following:

- Livestock grazing
- Wildlife habitat
- Aesthetics (e.g., recreational areas)
- Maintenance of biodiversity
- Timber production

The specific objective/s for the reclaimed area should be identified and documented. The landowner or land manager should be consulted.

At each assessment location, the operator will document the following parameters where applicable. The most applicable parameters should be measured (e.g., not necessary to document density AND cover).

These assessments are based on a visual comparison between the grid vegetation and the control (only where appropriate; use of a surrogate control, if available, is permissible).

Species Composition	<p>Revegetation species and species composition should be compatible with original or control vegetation or meet reasonable land management objectives.</p> <p><b>Plant composition on natural recovery sites won't look like offsite for a number of years (unless the surrounding area was recently burned or harvested). Evaluation of an early successional plant community is acceptable. The main native vegetation species should be documented, as well as any non-native weeds or agronomic species. Notes should be made about the compatibility of the species present on the site with</b></p>
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	<p>the existing or intended land use. In forested natural recovery areas, for example, some early succession understory species can recover quite quickly (e.g., fireweed).</p>
Density	<p><math>\geq 80\%</math> of control.</p> <p><b>Density (plants/unit area) is only used for young or grazed/hayed stands of native grass/forbs; it is also used for shrubs and trees. Density should approximate control densities (if comparable) or be sufficient to prevent erosion.</b></p>
Height	<p><math>\geq 80\%</math> of control.</p> <p><b>Height is not applicable for comparing grass/forb stands to offsite unless the controls contain the same species and the stands are of similar age. Height measurements have value for determining relative age/performance of shrubs/trees.</b></p>
Health	<p>Plants should be healthy. Characteristics to look for are vigour, height, colour, disease and vegetation quality.</p> <p><b>It is important to look at above and below ground (root) health for native species re-establishing on reclamation sites.</b></p>
Cover	<p>Where the control vegetation is similar, <math>\geq 80\%</math> of control.</p> <p><b>This does not apply to most sites revegetated within native landscapes; the control vegetation is likely to be different from the reclaimed area unless the natural recovery site is very old. The cover requirement can be waived if all the natural recovery assessment criteria in this IL are met.</b></p> <p>If the control vegetation is similar and has <math>&lt;40\%</math> cover, the site should be 100% of control.</p> <p><b>The cover requirement can be waived if all the natural recovery assessment criteria in this IL are met.</b></p> <p>Where there is no control vegetation, or the control vegetation is different, <math>\geq 80\%</math> cover unless otherwise authorized by the CRI in writing.</p> <p><b><math>\geq 80\%</math> cover may not be necessary or desirable. The cover requirement can be waived if all the natural recovery assessment criteria in this IL are met. More cover may be required on a wellsite in a heavily grazed pasture, for example, than in an area where the objective is to maximize vegetation diversity and there is little grazing or browsing pressure. If the end land use is timber production, then the amount of cover on the site should be sufficient to prevent erosion but not impede tree growth.</b></p> <p>Litter can be included in the cover assessment, however cannot contribute more than the amount on the control. Amendment materials (e.g., straw) are not included as litter in the calculation for cover.</p> <p><b>There should be sufficient live cover on the site to sustain the intended end land use. Straw that has been crimped onto a wellsite is acceptable for inclusion in a cover assessment, providing that it is not impeding plant growth.</b></p> <p>The required cover must be evenly distributed on the site or be similar to the distribution on the control.</p> <p><b>Offsite areas are useful in determining what acceptable distribution of a particular native species should be; patchy or discontinuous cover can be expected in natural landscapes.</b></p>

### **Fertilizer (from Wellsite Reclamation Criteria 1995)**

On public lands, it is expected that native species will not be fertilized unless the CRI gives approval. Fertilizer use must be documented in the Detailed Site Assessment Report.

**Fertilizer should not be necessary for natural recovery sites. Nitrogen fertilizer, in particular, tends to promote problem species at the expense of more desirable ones and should not be applied.**

### **Length of Time Prior to Industry Assessment (from Wellsite Reclamation Criteria 1995)**

Generally expect one full growing season including an over wintering period and a minimum of twelve months from time of seeding on sites without fertilizer. On sites that have been fertilized, generally expect two years from the time of fertilizer addition.

Length of time prior to industry assessment will vary with site size, location (related to rainfall and temperature) and soil type and salvage procedures. Sites where topsoil was carefully salvaged and replaced within the same growing season is likely to be ready for assessment after a full growing season and an over-wintering period. Sites in drought-prone prairie areas may not meet the assessment criteria in this IL for several years (usually three to five years under normal precipitation). Conditions on the site should be documented in the Detailed Site Assessment.